

REMARKS

The Applicants thank the Examiner for the careful consideration of this application and for the interview with Applicants' representative on August 8, 2011. The Office Action dated February 16, 2011, has been received and its contents carefully considered. Claims 1-28 are currently pending in this application. Claims 17-27 are currently withdrawn in response to an earlier Restriction. Claim 1 is amended. Support for the amendment to claim 1 may be found throughout the specification, for example, on page 6, lines 3-5, page 7, lines 16-21, page 12, lines 3-6, page 21, lines 3-4, page 22, lines 11-13, and page 23, lines 7-9. Based on the foregoing amendments and the following remarks, the Applicants respectfully request that the Examiner reconsider all outstanding rejections and that they be withdrawn.

STATEMENT OF THE SUBSTANCE OF THE INTERVIEW

Participants: (1) Examiner Bach Dinh, (2) Examiner Olsen, (3) Michael E. Nelson (Applicants' Representative), and (4) Steve Schwarz (Applicants' Representative)

Date of Interview: August 8, 2011

Type: Telephonic

A) Brief Description of the Nature of any Exhibit Shown or any Demonstration Conducted:

None.

B) Identification of the Claims Discussed: 1.

C) Identification of Specific Prior Art Discussed: Ruger et al. (5,834,224).

D) Identification of the Principal Proposed Amendments of a Substantive Nature:

Claim 1. A sensing device comprising an electrode comprising a noble metal layer, on which layer is located a biological material having nitroreductase activity, wherein the biological material comprises a plurality of cysteine residues and wherein ~~conjugation of the biological material and the noble metal layer is via cysteine linkages~~ said cysteine residues adsorb directly to the noble metal layer.

E) Substance of Interview: Examiner's Request for Information was discussed. Proposed amendment to claim 1 was discussed.

F) Other Pertinent Matters Discussed: Examiner requested a declaration from inventors concerning non-presented poster and published abstract. Applicants representatives agreed to seek a declaration from the inventors.

G) General Results or Outcome of the Interview: Examiner agreed to withdraw Request for Information. Examiner agreed that the original specification supports amended claim 1, and also agreed that the amendment to claim 1 overcomes the rejections based on Ruger et al., as currently applied. The Examiner reserved the right to review Ruger et al. further.

Request for Information

On pages 2-3, the Office Action requests a copy of a poster titled "Poster 50: The Development of an Amperometric Enzyme Sensor for the Detection of Explosives," having the abstract published with posters of the 2003 Younger European Chemists' Conference. An abstract was submitted to the Younger European Chemists' Conference, but the full poster was never submitted to the Conference, nor presented at the Conference. The only information made publicly available was the abstract, which is already of record. As requested by the Examiner in the interview on August 8, 2011, a Declaration from the inventors will follow in a supplemental submission. In the interview on August 8, 2011, the Examiner agreed to withdraw the Request for Information after submission of the aforementioned Declaration. Applicants therefore respectfully request the Request for Information be withdrawn.

Claim Rejections - 35 U.S.C. §103(a)

(1) On pages 4-6, the Office Action rejects claims 1-7, 9, 13, 16, and 28 under 35 U.S.C. §103(a) as allegedly obvious with respect to Willner et al. (U.S. 5,443,701), in view of Ruger et al. (U.S. 5,834,224) with evidence provided by Shah et al. (U.S. 5,777,190). Applicants respectfully traverse.

As to claim 1, the combination of Willner et al., Ruger et al., and Shah et al. does not teach or reasonably disclose a sensing device with biological material comprising "a plurality of cysteine residues and wherein said cysteine residues adsorb directly to the noble metal layer."

Willner et al. describes sensing devices. The Office Action appears to align Willner's glutathione reductase (see Willner, Figure 17) with the claimed biological material having nitroreductase activity. The devices described by Willner include a linking group (see Willner et al., Figure 17, column 2, lines 32-37, column 3, line 1-column 4, line 15) covalently linked to the enzyme and between an electrode material and an enzyme (see Willner, Figures 10, 14, 17, 20, 22). Willner et al. does not disclose "cysteine residues adsorb[ed] directly to the noble metal layer."

Ruger et al. does not cure the deficiencies of Willner et al. Ruger et al. describes an electrochemical sensor having a noble metal surface, and a homogenous monolayer on the surface comprising "binding molecules" linked to an enzyme by ionic, covalent, or metal chelate bond (see Ruger et al., column 2, lines 35-42). The "binding molecule" includes a "spacer" between an "anchor group" and "end group" (see Ruger et al., column 5, lines 11-24). The "binding molecule" of Ruger et al., corresponds to the linking group of Willner et al., but include non-covalent (i.e. ionic, or metal chelate) binding to enzymes. Ruger et al. describes recombinant enzymes having chelate-forming amino acids, such as histidine and cysteine modified proteins (see Ruger et al., column 4, line 14-24) to bind to the "end group" of a "binding molecule" (see Ruger et al., column 4 line 66- column 5, line 2). Ruger et al. does not disclose "cysteine residues adsorb[ed] directly to the noble metal layer."

Both Willner et al. and Ruger et al. require a "linking group" or "spacer" between the enzyme and electrode material or metal surface. Shah et al. does not cure the deficiencies of

Willner et al. and Ruger et al. The combination of references therefore does not teach nor reasonably disclose a sensing device with biological material comprising "a plurality of cysteine residues and wherein said cysteine residues adsorb directly to the noble metal layer," as recited by claim 1. Applicants respectfully request the rejections be withdrawn.

Claims 2-7, 9, 13, 16, and 28 depend, directly or indirectly, from claim 1 and are allowable for at least the same reasons as claim 1. Applicants request the rejection be withdrawn.

(2) On pages 6-9, the Office Action rejects claims 8 and 14-15 under 35 U.S.C. §103(a) as allegedly obvious with respect to Willner et al. (U.S. 5,443,701), in view of Ruger et al. (U.S. 5,834,224) and further in view of Grove et al. (WO 03/018788) and Shah et al. (U.S. 5,777,190). Applicants respectfully traverse.

Claims 8 and 14-15 depend, directly or indirectly, from claim 1. Grove et al. does not cure the deficiencies of Willner et al., Ruger et al., and Shah et al. Grove et al. discloses nitroreductase enzymes, but does not disclose a sensing device with biological material comprising "a plurality of cysteine residues and wherein said cysteine residues adsorb directly to the noble metal layer," as recited by claim 1. Applicants request the rejection be withdrawn.

(3) On page 9, the Office Action rejects claim 10 under 35 U.S.C. §103(a) as allegedly obvious with respect to Willner et al. (U.S. 5,443,701), in view of Ruger et al. (U.S. 5,834,224) and further in view of Matsumoto et al. (U.S. 5,795,774) and Shah et al. (U.S. 5,777,190). Applicants respectfully traverse.

Claim 10 depends, indirectly, from claim 1, and is allowable for at least the same reasons as claim 1. Matsumoto et al. is relied upon on for the use of polycarbonate, but does not disclose a sensing device with biological material comprising "a plurality of cysteine residues and wherein said cysteine residues adsorb directly to the noble metal layer," as recited by claim 1. Applicants request the rejection be withdrawn.

(4) On page 10, the Office Action rejects claims 11-12 under 35 U.S.C. §103(a) as allegedly obvious with respect to Willner et al. (U.S. 5,443,701), in view of Ruger et al. (U.S. 5,834,224) and

further in view of Saini et al. (U.S. 5,521,101) and Shah et al. (U.S. 5,777,190). Applicants respectfully traverse.

Claims 11-12 depend from claim 1, and are allowable for at least the same reasons as claim 1. Saini et al. does not cure the deficiencies of Willner et al., Ruger et al., and Shah et al., discussed above. Saini et al. describes insulating substrates, but does not disclose a sensing device with biological material comprising "a plurality of cysteine residues and wherein said cysteine residues adsorb directly to the noble metal layer," as recited by claim 1. Applicants request the rejection be withdrawn.

(5) On pages 10-12, the Office Action rejects claims 1-7, 9, 11-13, 16, and 28 under 35 U.S.C. §103(a) as allegedly obvious with respect to Ruger et al. (U.S. 5,834,224) in view of Willner et al. (U.S. 5,443,701) with evidence provided by Shah et al. (U.S. 5,777,190). Applicants respectfully traverse.

Ruger et al., Willner et al., and Shah et al. are discussed above. The combination of references does not teach or reasonably describe a sensing device with biological material comprising "a plurality of cysteine residues and wherein said cysteine residues adsorb directly to the noble metal layer," as recited by claim 1. Both Willner et al. and Ruger et al. require a "linking group" or "spacer" between the enzyme and electrode material or metal surface. Shah et al. does not cure the deficiencies of Willner et al. and Ruger et al. The combination of references therefore does not teach nor reasonably disclose all of the elements of claim 1. Applicants respectfully request the rejections be withdrawn.

Claims 2-7, 9, 11-13, 16 and 28 depend, directly or indirectly, from claim 1 and are allowable for at least the same reasons as claim 1. Applicants request the rejection be withdrawn.

(6) On pages 12-15, the Office Action rejects claims 8 and 14-15 under 35 U.S.C. §103(a) as allegedly obvious with respect to Ruger et al. (U.S. 5,834,224) in view of Willner et al. (U.S. 5,443,701) and further in view of Grove et al. (WO 03/018788) and Shah et al. (U.S. 5,777,190). Applicants respectfully traverse.

These references are discussed above. Claims 8 and 14-15 depend, directly or indirectly, from claim 1 and are allowable for at least the same reasons. Regardless of the order the references, the combination of references does not disclose a sensing device with biological material comprising "a plurality of cysteine residues and wherein said cysteine residues adsorb directly to the noble metal layer," as recited by claim 1. Applicants request the rejection be withdrawn.

(7) On page 16, Office Action rejects claim 10 under 35 U.S.C. §103(a) as allegedly obvious with respect to Ruger et al. (U.S. 5,834,224) in view of Willner et al. (U.S. 5,443,701) and further in view of Matsumoto et al. (U.S. 5,795,774) and Shah et al. (U.S. 5,777,190). Applicants respectfully traverse.

These references are discussed above. Claim 10 depends, indirectly, from claim 1 and is allowable for at least the same reasons. Regardless of the order the references, the combination of references does not disclose a sensing device with biological material comprising "a plurality of cysteine residues and wherein said cysteine residues adsorb directly to the noble metal layer," as recited by claim 1. Applicants request the rejection be withdrawn.

Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is hereby invited to telephone the undersigned at the number provided.

The Commissioner is authorized to charge any deficiency in any patent application processing fees pursuant to 37 CFR § 1.17, including extension of time fees pursuant to 37 CFR §

1.17(a)-(d), associated with this communication and to credit any excess payment to Deposit Account No. 22-0261.

Dated: August 15, 2011

Respectfully submitted,

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